

Common Errors in the Management of Acute Myocardial Infarction

A Critical Analysis of 58 Fatal Cases

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SUMMARY

Three prominent errors were observed in the management of 58 fatal cases of acute myocardial infarction.

Pain was inadequately relieved in over one-third of the patients.

In several other cases rest was inadequate, with attendant complications.

In three cases sudden death was preceded by irregularities of cardiac rhythm which were noted but not treated.

Length of Stay in Hospital Before Death	Number of Patients
1 - 6 hours	10
6 - 24 hours	10
1 - 3 days	14
Up to 1 week	8
Up to 2 weeks	10
Up to 4 weeks	6

DIAGNOSIS

In six cases the diagnosis of acute myocardial infarction was not made until autopsy. In one of these cases, angina was confused with pain from a recent abdominal operation. In another the patient had chronic rheumatic heart disease with mitral stenosis, and the course was typical of congestive failure; although the patient had some angina, it was disregarded. In a third case, in which the diagnosis was "severe angina," the patient died suddenly a few hours after entry; and in another hemiplegia and coma developed at about the probable time of the infarct. In none of these four cases was an electrocardiogram made. In the remaining two cases, symptoms typical of acute myocardial infarction were lacking, and the electrocardiogram pattern did not suggest it. In one of these two, infarction was directly posterior; in the other a right bundle branch block obscured the pattern. In this latter case ambulation was permitted, and in a few days the left ventricle ruptured.

Diagnosis in the rest of the cases in this series was made before or within a few hours after hospital entry.

RELIEF OF PAIN

In all but four of the 58 cases in this series, the patient entered the hospital with some degree of chest discomfort. These 54 patients may be divided into three groups:

- Thirty-one were relieved of chest distress within one and one-half hours after entering the hospital.
- Nine had moderate chest pain (sufficient to cause frequent complaint) for a period of from one and one-half to 36 hours after entry.
- Fourteen had severe chest pain for more than two hours after entry. The nurses' notes described the distress of these 14 patients in terms such as "unbearable," "excruciating," "very severe."

In none of the 23 cases included in Groups B and C did the patient's physician stay with him until the pain was relieved, and only one patient received

THERE are several generally accepted principles in the treatment of acute myocardial infarction. Rest and the relief of pain are unvarying rules, and it is agreed that control of arrhythmias and efforts to combat anoxemia and cardiac failure are often indicated.

In an effort to reduce the death rate from myocardial infarction, it is deemed of interest to survey, especially in relation to these principles, the management of this disease in a private institution where both specialists and general practitioners treat patients.

MATERIAL

This presentation analyzes the methods of management in 58 fatal cases of acute myocardial infarction in a 450-bed private hospital in a period of two and one-half years. The only basis of selection of these cases was that the diagnosis of acute myocardial infarction was unequivocal and verified by characteristic electrocardiographic patterns and/or at autopsy. Autopsy was done in 28 instances. Thirty of the patients were treated by 26 general practitioners, and 28 were treated by 11 internists.

There are 39 males and 19 females in this series, ranging in age from 45 to 82 years, and averaging 63 years. The age distribution and the time elapsed in the hospital before death were as follows:

Age Group	Number of Patients
40 - 50	7
51 - 60	19
61 - 70	18
71 - 80	12
81 - 90	2

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intravenous sedation. In nearly all of these 23 cases some narcotic such as morphine, Demerol,[®] or Dilaudid[®] was given hypodermically within a few minutes after entry. It evidently was assumed, however, that once the narcotic was given the pain would shortly be gone; and often three or four hours elapsed between injections. In several cases the physician followed the order for sedation with the direction "every four hours as needed for pain," thus encouraging disregard of the pain when it persisted.

More than half of the 14 patients in Group C (severe chest pain) had some degree of decreased peripheral vascular supply, and five were in frank shock, but conscious. As these patients were unable to absorb adequately the narcotic deposited in the peripheral tissues, they received little or no relief of pain. Five of the patients in this group died within three hours after entry, 12 within two days. None of the five who died within three hours were relieved of pain before death.

It is a possibility that relief of pain in these cases would have improved the prognosis. Indeed, pain may well have been the cause of death of at least one patient, a 67-year-old man with a long history of hypertension and angina pectoris but no other disease. He entered the hospital four hours after the onset of substernal pain which radiated to the arms and which he described as unbearable. He was in shock, but conscious and alert, and the blood pressure was 80 mm. of mercury systolic and 60 mm. diastolic. Two 10 mg. subcutaneous injections of morphine sulfate did not diminish the pain, and acute pulmonary edema developed three hours after admission to hospital. In another hour the patient died. (In the last half hour he was relieved of pain by intravenous injection of 10 mg. of morphine sulfate.) Autopsy revealed recent coronary occlusion without demonstrable myocardial infarction. The conclusion that pain reflexly produced pulmonary edema, and hence was the primary cause of death, is at least plausible.

Most of the 23 patients with protracted chest pain became progressively weaker and died undramatically. Four died abruptly. Autopsy was done in only one of the four cases; rupture of the left ventricle was noted.

REST

There was a prolonged period of pronounced restlessness in seven cases not included in groups B and C. These patients were given almost no sedation because they complained little of pain. One had frequent nausea and vomiting, and three were repeatedly out of bed. Autopsy in the former case and in one of the latter revealed ventricular rupture (which occurred on the third and sixth days respectively). The remaining three of these seven patients suffered constant anxiety, and two of them died very suddenly. Autopsies were not done.

ARRHYTHMIAS

It is well known that sudden, painless deaths in patients who are apparently improving after acute

myocardial infarctions may be due to ventricular fibrillation, and careful observation will often reveal irregular cardiac rhythm preceding this catastrophe.¹

In this series pronounced irregularity of the pulse was noted in three cases a few hours before abrupt, but painless, death. These patients were improving from moderately severe infarcts, two having entered eight days and one two days previously. Although the nurses had recorded these irregularities, the attending physicians were not informed, and none of these patients received quinidine. At autopsy, done in one case, an infarction limited to the septum was noted.

ABRUPT DEATH

There were twelve other deaths of similar, abrupt nature, but in these cases no irregularities of cardiac rhythm were recorded. These patients were all improving, and most of them had been in the hospital more than four days. Half were observed to die without pain, and the other half, although not observed at death, evidently had no warning, since none of them called a nurse. Autopsy was done in seven cases, and in four a ruptured left ventricle was observed (these were discussed elsewhere in this presentation). In the other three cases, however, there was no rupture or recent extension of the infarct; in two of them there was extensive necrosis in the superior portion of the interventricular septum. Three of these 12 patients, including the two with necrosis in the interventricular septum, were receiving quinidine.

In this group no error is implicit in the management of those patients who did not die of ventricular rupture. However, speculation with regard to paroxysmal arrhythmias, and the possible existence of prodromal irregularity of cardiac rhythm in some of these cases, seems permissible.

ADDITIONAL CASES

There are 18 cases not mentioned in the preceding categories. In those cases the patients became steadily worse, the majority dying with some degree of congestive failure. In each case this was treated adequately by accepted methods.

DICUMAROL

Reports of several large series testify to the efficacy of anticoagulants in reducing the incidence of thromboembolic phenomena in myocardial infarction.

Thirty-nine of the patients in this series did not receive dicumarol, and in one of these cases a cerebral embolus may have been the cause of death. No venous thromboses were observed.

Of the 19 patients who received dicumarol, one had frank hematuria, but in no case was bleeding a factor in the patient's death. Neither emboli nor thromboses occurred in this group.

DISCUSSION

There were three prominent errors in the management of a large proportion of the 58 patients who died of acute myocardial infarction.

First, the cardinal principle of relief of pain was poorly observed in 23 cases; in over one-half of them there was protracted pain of such severity that it might well have played a significant role in the fatal outcome. It is noteworthy that a narcotic was given promptly in nearly all of these cases on the assumption that once the medication was ordered the patient's pain would shortly be abolished. Intravenous sedation was clearly indicated for the several patients who had decreased peripheral vascular supply. Those in this group who were in frank shock might have been brought out of this grave state if the pain had been promptly relieved.

Second, rest was inadequate in several cases. Omission of adequate sedation, presumably because


the patients did not complain of pain, resulted in pronounced restlessness in six cases, in one of which the patient died of a ruptured right ventricle. In another case several days of vomiting were culminated by left ventricular rupture.

Third, three patients in this series had irregular pulse a few hours before sudden, painless death. In each case the nurse who recorded this irregularity did not inform the physician, and quinidine, which might have averted the disaster, was not given.

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REFERENCE

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The Use of the Benzidine Test for Occult Blood in Abnormal Mammary Secretions

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WHEREVER and whenever breast tumors are discussed the importance of bloody discharge from the nipple is stressed. Bloody discharge usually indicates an intraductal tumor which may or may not be malignant, and it is current opinion that the segment from which the blood comes should be surgically explored.

The discharge from these lesions is not constant. If the blood in the discharge is fresh, the erythrocytes are readily found in the smear, but if the blood in the discharged material is old the erythrocytes have disintegrated and do not appear on the smear. Intraductal debris may also cause secretion of material suggestive of old blood.

Because the presence of blood in the excreted material is an important point in the diagnosis of intraductal tumor, great care should be taken that it not be overlooked if present. The benzidine test is a valuable adjunct to the usual methods of determining the presence or absence of blood in abnormal mammary secretions. In order to be certain of the presence of blood in the discharge, it has been the practice for several years at this clinic to request that the benzidine test for occult blood be used in examining the secretion if erythrocytes are not readily found otherwise. If blood is found to be present by this test, the fact is considered diagnostic of intraductal tumor and exploration is recommended.

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